Pensions as a Form of Executive Compensation[*]

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Abstract

We investigate the role of pensions as an element of total executive compensation, and the relationship between pensions and performance-based compensation in executive pay. Using hand-collected data on FTSE 100 CEOs and senior executives from 2004−2011, we document that pensions function as a substitute to performance-based compensation (primarily bonuses) in both cross-sectional and time-series settings. We also examine the effect of corporate governance characteristics on executive pensions. We find that corporate governance characteristics associated with stronger board monitoring play a constraining role on the magnitude of pensions. Our evidence of substitution effects between pensions and performance-based compensation is consistent with a managerial power view of executive compensation-setting, and the use of pensions as a 'stealth' element of compensation. Our findings are robust to considering different types of pensions, product market competition, and cross-listing. Sub-period analysis shows that pensions decrease and substitution effects weaken following the 2008 financial crisis. Moreover, we find no evidence that the use of compensation consultants with potential conflicts of interest is associated with higher pensions. Overall, our study contributes to a greater understanding of the role of pensions in executive compensation, and shows the importance of including pensions in analysis of executive compensation.

Keywords: Pensions, Executive Compensation, Performance-based Compensation, Corporate Governance, Managerial Power

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1. INTRODUCTION

This paper examines the role of pensions, a frequently overlooked element of compensation, as part of the overall executive compensation package. Pension awards to executives have come under increased public scrutiny, in light of concerns following high profile corporate failures. Compensation disclosures from firms such as the Royal Bank of Scotland and BP highlight the economic significance of pensions, revealing total pension values of £16 million and £11 million for their CEOs, respectively, departing in the wake of disaster (Daily Telegraph, 2009a; The Independent, 2009).

In practice, pensions are important to investors, corporate governance analysts, regulators, and firms. Compensation committees consider pensions as an important element of compensation (Weight, 2013), and executives are known to negotiate their pension benefits (Treasury Committee, 2009).[1] Evidence also shows that investors are concerned with pensions as part of the larger debate on executive pay (Deloitte, 2004). Leading institutional investors in the UK, such as the Association of British Insurers (ABI), express concerns about sizeable pension awards to executives and the potential for pension payouts on termination to provide a mechanism of rewards for failure (PIRC, 2010). Pensions to executives are also on the agenda of policy-makers; new executive compensation disclosure regulations require listed UK firms to include pensions in their calculation of total executive pay, effective from 2014.[2]

We are motivated to examine pensions as relatively little is known about the role they play in executive compensation, despite their prevalence and economic magnitude. Much of prior research focuses on cash-based and equity compensation; few studies directly address the topic of executive pensions, and have done so mainly in the US setting (Bebchuk and Jackson, 2005; Cadman and Vincent, 2014; Edmans and Liu, 2011; Gerakos, 2010; Sundaram and Yermack, 2007; Wei and Yermack, 2011; Cassell et al.,

[1] We use the term 'executive' to refer to a Chief Executive Officer (CEO) and other executives such as the Chief Financial Officer (CFO), who are members of the board of directors. UK firms typically have a unitary board composed both of executive and non-executive directors, commonly referred to in the US as 'inside' and 'outside' directors, respectively. Our primary focus in this paper is on executives; we consider non-executives only as a governance mechanism in our empirical analyses.

[2] Large and Medium-sized Companies and Groups (Accounts and Reports) (Amendment) Regulations 2013, Schedule 8: Quoted Companies Directors' Remuneration Report

2012). Omission of pensions from prior research suggests that not only has total compensation been consistently underestimated, but that incentive effects of compensation packages are more complex when including pension-related incentives.

Academic literature offers competing views of the role of pensions in executive compensation. A growing stream of research examines the incentive effects of executive pensions and their relationship with equity holdings from an agency-based perspective, where pensions form debt-like incentives in optimal compensation contracts, and help to alleviate agency costs of debt vis-à-vis equity incentives to induce efforts (Jensen and Meckling, 1976). Consistent with the 'optimal contracting' view, empirical evidence shows that higher executive pensions serve to reduce overly risky managerial actions from equity incentives (Cassell et al., 2012) and align executives' interests with those of debtholders (Edmans and Liu, 2011; Sundaram and Yermack, 2007). This line of research suggests that executive pensions, as inside debt, represent a form of efficient contracting. Other studies examine the relationship between pensions and total compensation with mixed findings (Cadman and Vincent, 2014; Gerakos, 2010).

The lack of quality and transparent disclosures on executive pensions highlights their opacity, and contributes to our limited understanding of different types of pensions, across various corporate governance regimes. An alternative 'managerial power' view (Bebchuk and Fried, 2004a) suggests that executive compensation is subject to agency conflicts and is influenced by other factors such as executive power and discretion. The implication of this view is that pensions, due to their lack of visibility and complexity in valuation, provide a mechanism for executives to obscure and extract additional, largely performance-insensitive compensation, as they are 'under the radar.' Consequently, pensions may represent a form of stealth compensation to executives, particularly susceptible to managerial power influences.

Overall, the role of pensions in total executive compensation is inconclusive, given the competing theoretical views and mixed empirical results. We extend this literature by examining executive pensions in an international setting where disclosure requirements and governance of pension arrangements differ from those in the US.

Several institutional features of the UK setting enable us to perform more powerful tests of the managerial power hypothesis. First, disclosures required by UK law and governance codes allow us to obtain a unique dataset of disclosed, audited and actuarially estimated executive pension values. Second, in the UK, executives, as well as other rank-and-file employees, can transfer defined benefit pension entitlements out of employer-sponsored pension plans and into private pension plans. Such transfer-out entitlements potentially mitigate the strength of inside debt incentives to reduce risk. Indeed, anecdotal evidence from media reports, practitioners, and financial advisors suggests that inside debt incentives provided by pensions can be and have been circumvented when there is concern over prospects of the pension fund, and the ability of its sponsoring firm to contribute towards future deficits (Daily Telegraph, 2009b). This is particularly relevant for executives, who have inside information on the firm's ability and willingness to fulfill future pension obligations, effectively providing an option to withdraw their pension holdings before other claimholders. Third, UK pension legislation allows scheme members to withdraw 25% of their total accumulated value tax-free immediately on retirement, thus further reducing the strength of debt-based incentives.

Using a sample of UK-listed FTSE 100 CEOs and senior executives during the 2004–2011 period, we examine whether pensions function as substitutes or complements to performance-sensitive elements of the compensation package. In our cross-sectional analyses, we find evidence that pensions function as a substitute for performance-sensitive compensation (primarily bonuses), and excess compensation, after controlling for the mechanical relationship between pension and salary. We are cautious to draw strong inferences about causality on this cross-sectional substitution effect, as it may reflect variations in firm characteristics or what is considered 'optimal' between firms.

We therefore extend our analysis to examine the effect of corporate governance on executive pensions. Prior research finds that CEOs of firms with weaker governance receive higher compensation (Core et al., 1999). We find that stronger governance is associated with lower pensions and mitigates the substitution between pension and performance-sensitive pay. This result is consistent with Bebchuk and Fried (2004a)'s

managerial power hypothesis, where pensions can be used to extract rents and weaken pay-performance sensitivity, and is in line with expectations of weaker shareholder control over less transparent elements of compensation (Craighead et al., 2004). We then extend the analysis of executive pensions and performance-sensitive pay to a dynamic setting. We present evidence that, consistent with the managerial power hypothesis, decreases in bonuses are associated with increases in pensions, suggesting that pensions can also serve as dynamic compensation for bonus shortfalls, in a less visible way.

The sample period of 2004 to 2011 further enables us to examine the impact of economic changes on executive pensions. Our main findings are robust to the sub-period prior to the 2008 financial crisis, and we find that the substitution between pension and excess compensation is significantly weakened following the crisis. The constraining role of corporate governance on pensions remains robust. Our results also hold after controlling for product market power and foreign exchange listing, tax considerations, and in separate analyses of different types of executive pension incentives. Additional tests on the role of compensation consultants reveal no relationship between potentially conflicted compensation consultants and higher executive pensions.

Our paper makes several novel contributions to the emerging executive pension literature. First, we extend prior research by considering the relationship between pensions and performance-sensitive elements of pay, and investigating the dynamic relationship between changes in pensions and performance-based bonuses over time. We provide new empirical evidence of both cross-sectional and dynamic substitution effects between executive pensions and performance-sensitive types of compensation, during an extended sample period which encompasses the financial crisis. This complements prior US- and UK-based findings (Gerakos, 2010; Cadman and Vincent, 2014; Kabir and Minhat, 2009), and contributes to an enhanced understanding of the role of pensions in executive compensation. Considering the guaranteed nature of pensions, our findings suggest that prior compensation research has consistently underestimated the true proportion of compensation that is fixed, and overestimated the proportion that is at risk.

This may bias inferences about the composition of pay packages and the strength of pay-performance sensitivity.

Second, our study provides new evidence on the effect of corporate governance on executive pensions, showing that corporate governance plays a mitigating role on executive pensions. We contribute to an increased understanding of governance regimes and executive pension arrangements in the UK, a significant market of interest in compensation and governance research. Third, by covering both pre- and post-financial crisis periods, we provide evidence on the impact of the financial crisis and institutional changes on executive pension policy.

Last, our study is one of the first to provide a deeper examination of institutional arrangements governing pensions in a non-US setting, and provides a comprehensive overview of executive pensions in the UK. We show that pension awards to UK executives are economically significant and have evolved into complex arrangements. Furthermore, the complexity of disclosures increases the difficulty for shareholders to fully discern, quantify and monitor pension awards.

Section two synthesizes related literature and provides details on institutional arrangements governing executive pensions in the UK. Section three formulates the hypotheses. Section four discusses our data and research design. We present our results and extensions of our analysis in sections five and six, and discuss our findings and their policy implications in section seven.

2. LITERATURE AND INSTITUTIONAL CONTEXT

(i) The role of pensions in executive compensation

Traditional labour economics literature suggests that firms provide defined benefit pensions to their employees, including executives, for a number of reasons, including bonding them to the firm for the long term, mitigating shirking, and reducing incentives for risky behaviour, to ensure long-run firm survival. Pensions also reduce employee turnover, as employees have a vested interest in remaining at the firm until retirement age (Ippolito, 1991; Gustman et al., 1994). In the case of executives, we further observe

competitive labour market-related factors in the setting of pensions, where firms consider the competitiveness of their executive pension plan benefits. This suggests that firms view pensions as important to the total executive compensation package, and are conscious of similar provisions offered by competitors.

Several recent empirical studies provide evidence showing that pensions constitute an economically significant proportion of executive compensation. Bebchuk and Jackson (2005) estimate that pension benefits paid to 51 US CEOs have a mean total actuarial value of $17.1 million. In a sample of 287 US CEOs, Cadman and Vincent (2014) find an average CEO pension plan value of $10.2 million. Sundaram and Yermack (2007) find that annual increases in pensions constitute approximately 10% of total compensation for a sample of 237 US CEOs. In our study, we observe that pension-related compensation for executives is widespread in the UK, with 94% of FTSE 100 executives receiving one or more forms of pension-related compensation during the 2004−2011 period. These pension benefits are economically significant, comprising on average 13% of executive compensation and increasing fixed compensation by 72%. In spite of this importance, however, pensions remain relatively overlooked in the empirical compensation literature, as highlighted by Jenter and Frydman (2010) in their review of recent progress in compensation research.

Agency theory offers competing views of incentive effects of pensions in executive compensation. Several recent empirical studies hypothesize that pensions provide efficient 'optimal contracting' incentives to align interests between executives and debtholders (Sundaram and Yermack, 2007; Cassell et. al., 2012), reducing the propensity for risky behavior, especially under the threat of bankruptcy (Edmans and Liu, 2011). Sundaram and Yermack (2007) suggest that the payment structure of pension awards is similar to corporate debt contracts, and refer to them as inside debt. Similar to debt, a pension entitles the holder to a stream of pre-defined cash flows over a long period of time, which would also be at risk in case of corporate default. In a sample of large US firms, they find that CEOs with higher pension to equity ratios manage their firms more conservatively. Wei and Yermack (2011) show that US firms with high levels of inside

debt were more likely to experience increases in bond prices and decreases in share prices in response to SEC reforms to enhance disclosures of executive pension entitlements. Cascino and Veenman (2014) find that inside debt use is associated with more efficient contracting. The emerging 'inside debt' literature, however, has not provided insights into the role of corporate governance, and the relationship between pension and performance-sensitive compensation.

Another strand of research frames executive pensions as a mechanism of rent extraction (Bebchuck and Fried, 2004b; Bechuck and Jackson, 2005). Bebchuk and Jackson (2005) propose that pensions function as a mechanism of camouflage, or 'stealth' compensation, since non-existent or poor quality disclosures on executive pensions reduce the level of observable compensation. Such stealth compensation reduces potential criticism about over-compensation and non-performance-sensitive compensation, and provides a greater cushion from the potential 'outrage' level, which would generate unwanted attention. Cadman and Vincent (2014) find that CEO pensions are not performance-sensitive, while Kabir and Minhat (2009) find lower pay-performance sensitivity when including pensions in measures of total compensation, reducing the riskiness of overall compensation. Kalyta and Magnan (2008) provide empirical results broadly consistent with a rent extraction view, for a sample of Canadian firms. They find that the use and size of Supplemental Executive Retirement Plans (SERPs) is positively related to CEO power, and that powerful CEOs are more likely to extract additional compensation that is largely independent of performance. Kabir and Minhat (2009), who to our knowledge provide the only other study of UK firms, find that CEO power is associated with higher pensions.

A few recent studies examine the relationship between executive pensions and other types of compensation, with mixed findings. Gerakos (2010) finds that the use of executive pensions is negatively related to the rest of the compensation package. By contrast, Cadman and Vincent (2014) find that in a sample of US firms, pensions are complementary and positively associated with overall compensation. Prior research from pension economics suggests that there may be a tradeoff between salary and pensions.

Under competitive market conditions, workers of similar productivity and ability receive equal total compensation, but possess heterogeneous preferences for pay and benefits. Such equalizing theory predicts a dollar-for-dollar tradeoff between worker wages and benefits such as pensions. However, empirical studies in the economics literature typically find insignificant relationships for the wage-pension tradeoff, or mixed evidence (e.g. Gunderson, et al. 1992). Furthermore, it is unclear whether any relationships observed for rank-and-file employees would be applicable to executives, who are generally characterized by superior abilities, have greater bargaining power with boards, and earn higher compensation of all types. Overall, the competing views of pensions, as an optimal form of executive pay or as a mechanism of rent extraction, have not been fully reconciled. To extend this literature, we explore the relationship between pensions and performance-sensitive compensation, and the role of corporate governance in executive pension awards.

(ii) Institutional arrangements in the UK

Executive pensions in the UK are subject to significant variation. Executives are typically members of an approved occupational pension scheme, and a separate scheme is often provided for senior managers and executives. The key types of pension provisions offered to executives include (i) defined benefit pension, (ii) defined contribution pension, (iii) an explicit cash salary supplement in lieu of pension, or (iv) any combination of these three. Our data show that approximately 94% of FTSE 100 executives receive some form of pension-related compensation, indicating widespread prevalence.

Executive pension plans are largely governed by the same legislation as other pension schemes; however benefits and entitlements may differ from those in occupational schemes for rank-and-file employees. Approved executive plans are regulated by the UK Pension Schemes Office, provided that contributions are within limits set by HMRC (the UK tax authority). UK legislation imposes maximum annual and lifetime limits on tax-deductible pension benefits under approved schemes. While these limits do not affect the vast majority of rank-and-file pension plan members, many executives exceed the limit, and firms may provide supplemental (unapproved) retirement

plans which are not tax-registered, to top up the approved, tax-deductible retirement benefits.[3] Therefore, differences in magnitude and structure of executive pensions, and the level of inside information, mean that risks and incentives from executive pension packages are likely to differ from those of rank-and-file employees.

Different types of pension compensation are subject to different types of risk. Future payouts of defined benefit pension plans depend on the financial strength of the pension fund and the sponsoring firm's ability to fulfill any future pension fund deficits. Therefore, market-based risks of invested pension assets lie with the pension fund, except in the case of insolvency, where part of the investment risk is then shifted to the individual.[4] In contrast, risks of defined contribution pensions are entirely borne by the individual, and salary supplements are risk-free. However, as we note in the introduction, UK executives' exposure to risks from defined benefit pension plans can be managed or circumvented via the transfer of approved pension benefits out of the plan into a private defined contribution fund, which can then be invested at the individual's chosen level of risk (including risk-free assets).[5] While such transactions must be disclosed if they occur during an executive's tenure, once he/she leaves the board, disclosure is no longer required, reducing long-term risk after leaving the firm. Supplemental unapproved benefits may be payable immediately on retirement, further reducing long-term risk.

Despite the prevalence of pensions to executives, compensation research in the UK has largely focused on cash and equity-based compensation. Difficulty in obtaining data on executive pensions is likely related to the complex nature of pension arrangements and their disclosures. For example, the data source used by Voulgaris et al. (2010), Horton et al. (2012), and Ozkan et al. (2012) on UK executive pay includes only defined contribution pension data.

[3] Supplemental plans include Funded Unapproved Retirement Benefit Schemes (FURBS) and Unfunded Unapproved Retirement Benefit Schemes (UURBS), similar to SERPS, discussed by Sundaram and Yermack (2007) and Kalyta and Magnan (2008) in the US and Canadian settings, respectively. We note that the proportion of benefits accrued under non-tax qualified (supplemental) schemes does not typically comprise the majority of executive pension benefits in the UK during our sample period.

[4] Though a government defined benefit pension guarantee exists in the UK, most executives would be well over individual limits in case of insolvency, of approximately £31,000 per year as of April 2013.

[5] See Appendix A for HSBC Holding's disclosure of a transfer out case of defined benefit entitlements.

Regulations governing disclosure of executive pensions in the UK have evolved alongside corporate governance codes on compensation. Required disclosures on pensions to executives have steadily increased since the Cadbury Report (1992), and are governed during our sample period by the Directors' Remuneration Report Regulations (2002), the Combined Code on Corporate Governance (2003; 2006), and the Financial Services Authority (FSA) Listing Rules. These regulations require listed firms to disclose various forms of pension-related compensation, the audited actuarial present value (transfer value) of the total accrued defined benefit pension at the end of each fiscal year, and related pension values for directors involved in a company pension plan.

Consistent with findings from practitioners and regulators (Deloitte, 2004, BIS, 2011), we observe significant variation in disclosure practices of UK firms. Pension disclosures require careful attention and expertise to comprehend, due to the complexity and variety of pension arrangements, many involving multiple pension components. Assessing their value, economic significance and incentive effects is further complicated by non-uniformity in disclosure location and presentation within remuneration reports. Different types of pension compensation are often tabulated or described in different sections of the same compensation report, and are often excluded from the primary compensation table, or described in dense narrative or footnotes. Such discrepancies in disclosure practices and opacity have likely contributed to pensions being overlooked by researchers and data providers, inadvertent omission of some pension components even when collecting data, and their perception as a mechanism of rent extraction. Regulators have noted that this variability in disclosure is problematic to users (BIS, 2011), and recent reforms of executive compensation disclosure in the UK require standardized pension disclosures from 2014 onwards. In contrast, US firms have followed a standardized SEC template for executive pension disclosures since 2006.

3. HYPOTHESES

Our first hypothesis considers the role of executive pensions in total compensation from a traditional equilibrium perspective, with agency conflicts among shareholders and executives (see among others, Jensen and Meckling, 1976; Holmstrom, 1979; Grossman and Hart, 1983). Executive compensation under 'optimal contracting' is structured to provide an efficient set of incentives through mechanisms such as performance-based bonuses, salary increases, stock options, and dismissal decisions, which induce the executive to make optimal decisions for the firm. Consequently, economic factors, rather than institutional factors, should be significant in explaining variations in the level of total observable compensation (e.g. Holmstrom, 1979). The unexplained part thus reflects the excess or deficiency in visible pay levels. Such an equilibrium compensation package from the views of both the executive and the firm would comprise all elements of compensation, including pensions, irrespective of disclosure requirements. If overall compensation reflects an equilibrium outcome, executives viewed as over-compensated (i.e. having an excess in total visible pay levels) would receive a lower pension, *ceteris paribus.* This leads to the prediction that, in equilibrium, pensions are higher in firms that offer lower total visible compensation. However, evidence of a systematic cross-sectional relationship between total visible compensation and pensions is not sufficient to discriminate between the 'managerial power' and 'optimal contracting' views of pensions. This is because, under equilibrium compensation setting, cross-sectional substitution between pension and visible pay may reflect variations attributable to firm characteristics or in what is considered 'optimal' between firms.

Alternatively, the managerial power view is not constrained by the assumption that observed board and ownership structure induce optimal contracting, and predicts that powerful agents within organizations have the ability to extract additional rents, with an aim to maximize their own wealth (Hirshleifer, 1978; Bebchuck et al., 2002; Bebchuck and Fried, 2004a). Prior research shows that the disclosure environment influences the structure and performance-sensitivity of compensation (Craighead et al., 2004). Due to the lack of quality and transparent disclosure of executive pensions, the managerial power

view suggests that pensions function as a less visible element of compensation contracts, and may be more favourable than bonus or other performance-sensitive compensation, which are more easily monitored by shareholders. Though under economic theory, short-term compensation is preferable to longer-term compensation, executives may agree *ex-ant*e to accept a reduction in short-term bonuses, because of the risks associated with underlying incentives. Equity-based incentives, furthermore, are also contingent on vesting conditions. In contrast, the certainty and vested rights associated with pensions may outweigh the costs of deferring the compensation to the longer-term. Pensions also provide a guaranteed post-retirement income stream, providing security for risk-averse executives. Moreover, executives may also agree *ex post* to accept smaller bonuses, resulting from poor performance, for public visibility or signaling reasons. In this case, accepting opaque and poorly-disclosed pension compensation may be preferable to criticism of "greed' or unwarranted bonuses, which risk shareholder dissention. In the latter case, pensions provide a mechanism for managers to camouflage their total publicly visible pay, and reduce potential outrage costs (Bebchuck and Jackson, 2005). Therefore, other things being equal, executives face incentives to trade off performance-sensitive compensation for additional pension benefits.

While it is possible in theory that executives could also trade off current period salary for future pension benefits (Gunderson, et al. 1992), executives face few incentives to reduce salary in practice, since it is typically the basis for determining other elements of compensation, including bonuses, equity, and pensions (Weight, 2013).[6] We therefore predict cross-sectional negative relationships between pensions and performance-sensitive compensation (bonuses and equity grants). We formulate our null hypotheses H_{1a} and H_{1b} as follows:

H_{1a}: The magnitude of pensions is negatively related to total visible compensation.
H_{1b}: The magnitude of pensions is negatively related to performance-sensitive compensation.

[6] Incentives faced by CEOs and senior executives are likely to be different from rank-and-file employees; it is widely observable they receive higher salaries, higher pensions, and higher total compensation than rank-and-file employees.

There are reasons to predict, however, that cross-sectional substitution between pension, excess compensation, and performance-sensitive compensation could be the outcome of unresolved agency problems. Kalyta and Magnan (2008) show that more powerful CEOs receive higher levels of non-tax qualified supplemental pensions, while Core et al. (1999) find that excess compensation is associated with poor corporate governance. To help discriminate between alternative theoretical predictions, we next explore the effect of corporate governance on pensions, focusing on board monitoring.[7]

Regardless of the extent of managerial power, rent extraction is constrained by mechanisms of shareholder control, including corporate governance mechanisms. The managerial power theory suggests that powerful executives, combined with board conflicts of interest and weak monitoring, influence the compensation-setting process to obtain higher or more favourable compensation packages (Bebchuk and Fried, 2004a). Several studies lend support to this argument, for example, examining the role of corporate governance (Core et al., 1999), compensation consultants (Murphy and Sandino, 2010; Voulgaris et al., 2010), and opportunistic timing of option grants (Yermack, 1997), among others. The managerial power hypothesis predicts that as the CEO's power over the board increases and as the board's monitoring capabilities decrease, the CEO will be able to extract additional rents and the compensation package will shift in his favour. Therefore, we state the second hypothesis in alternative form:

H_2: Pensions are higher in less well-governed firms.

In H_1 our predictions of substitution between pension and performance-sensitive compensation focus largely on cross-sectional differences in firm-level compensation policies, which may result in an equilibrium level of total compensation when including pensions. Similarly, prior empirical research on executive pensions largely focuses on cross-sectional differences between firms. However, substitution may also occur over time. In particular, pensions can be used as a mechanism to offset decreases in visible

[7] We focus on governance quality primarily from a board monitoring perspective for institutional reasons, as it is more applicable in the UK setting than CEO power. Common measures of CEO power from prior research, such as CEO/Chairman duality and director interlocks, are not widely occurring in the UK, and therefore, focusing on monitoring variables is more appropriate in our setting.

elements of compensation, such as bonuses, during periods of poor performance. We therefore extend H_{1b} to a dynamic setting, allowing for pensions to function as a substitute for performance-sensitive compensation over time. Such 'dynamic' substitution would reduce the likelihood of public outrage, and promote an impression of higher pay-performance sensitivity via total visible pay (Bebchuk and Fried, 2004b). Consistent with a view of manager-influenced compensation, we therefore predict a dynamic substitution between bonuses and pensions. We make no predictions about a dynamic relationship with equity, which is a long-run instrument that has potential for growth or recovery in subsequent periods. The above discussion leads to the following 'dynamic' substitution hypothesis:

H_3: Decreases in bonuses are associated with increases in pension compensation.

4. RESEARCH DESIGN

(i) Sample and data

Our sample is composed of all executives of UK firms in the FTSE 100 index each year from 2004 to 2011, excluding investment trusts and real estate trusts. We end our sample period in April 2011 in light of changes in HMRC regulations, which reduced the limit of tax-deductible pensions to £50,000 per annum from the 2011/2012 tax year onwards. This change may have led firms to re-evaluate their overall pension compensation policy (Weight, 2013), introducing bias into later analysis.

We hand-collect pension data for each executive from annual reports, including (i) changes between beginning- and end-of-year actuarial present values of defined benefit pension entitlements (changes in the transfer value of the pension, net of inflation),[8] (ii) the firm's contributions to an executive's defined contribution pension plan, and (iii) the total salary supplement paid to an executive, either to make his own pension arrangements, to supplement a defined benefit or defined contribution pension

[8] The actuarial present value of future defined pension benefits is calculated according to the number of years of service, expected average or final salary at retirement, using the prevailing benefit formula, using actuarial assumptions about life expectancy and market interest rates. These are calculated in accordance with the Actuarial Guidance Note GN11, published by the UK Institute of Actuaries and the Faculty of Actuaries. We note that the transfer value represents the amount that may be transferred to another pension plan, including defined contribution plans, and that benefits may be renegotiated.

which has already reached the HMRC tax limit, or to cover taxes arising from pension benefits above the HMRC tax limit.[9]

Data on other elements of executive compensation, age, tenure, ownership, and board characteristics are obtained from BoardEx, and accounting and market data from Datastream. FTSE index membership and industry classification are obtained directly from FTSE. After excluding executives without a full year of service, and those with missing compensation or Datastream data, our sample consists of 585 firm-years and 2,140 executive director-years.

(ii) Descriptive statistics

Table 1 presents descriptive statistics of firm-level characteristics for our sample firms. The median *LogAssets* corresponds to a firm with median total assets of £6.6 billion. Both operating performance, *ROA*, (10%) and market returns, *Return*, (16%) are on average positive over the sample period. The median *BTM* ratio is 0.23 and median firm *Leverage* is 19%. Untabulated correlation matrices show some modest correlation between our regression variables. However these correlated variables are used in different model specifications, with the exception of *BTM* and *Leverage*, which we include as controls.

INSERT TABLE 1 HERE

Table 2 provides a breakdown of executive compensation for all CEOs and non-CEO executives in our sample. For brevity, we pool CEO and non-CEO data, but untabulated descriptives show that CEOs earn significantly more than their non-CEO counterparts. Executives receive an average pension award of £352,000, or 72% of *Salary*. The mean CEO pension (£519,000, untabulated) is comparable to that found by Kabir and Minhat (2009), who find an average UK CEO pension of £300,000 during the period 2003−2006. Pensions constitute a significant fraction (13%) of total compensation

[9] Appendix A provides an example of a multi-element pension arrangement, with the executive C.R. Hyman of Serco plc accruing defined benefit pension entitlements with a transfer value, net of inflation, of £17,549, defined contribution payments of £10,815, and additional salary supplements of £98,406, for a total pension-related compensation of £126,770, or approximately 18% of his total compensation (excluding pension).

including pension, comparable to the mean annual pension as a percentage of pay found in prior US studies (Sundaram and Yermack, 2007; Gerakos, 2010).

INSERT TABLE 2 HERE

Table 3 presents a distribution of pension plan types for all executives in our sample. These include three key types of pension provision: (i) defined benefit pension, (ii) defined contribution pension, (iii) salary supplement, all combinations and permutations, and no pension-related compensation. We observe considerable heterogeneity in executive pension arrangements, and note that defined benefit plans are the dominant form of pension for executives in FTSE 100 companies. However, the data show a gradual move away from defined benefit only plans, in possible response to changes in the UK's pension taxation regime in April 2006, the 2008 financial crisis, and in anticipation of further regulatory changes in April 2011.

INSERT TABLE 3 HERE

(iii) Cross-sectional analysis of pensions and other elements of compensation

We first test H_{1a} by examining whether pensions form part of an equilibrium compensation package and whether excess compensation is associated with higher or lower pensions. We first estimate under- or over-compensation as the residual from a model regressing *Log(Total pay)* (excluding pensions) on economic determinants. Consistent with prior research, our total compensation model includes a comprehensive set of firm-level controls (Core et al., 1999; Murphy, 1999; Jenter & Frydman, 2010), tenure of the executive on the board of directors (*Tenure*), and the executive's ownership (*%Ownership*) in the firm (Hill and Phan, 1991; Cyert et al., 2002). We include age group, year, and industry controls. Following Core et al. (2008), we measure *Residual pay* as the difference between observed *Total pay* (excluding pensions) and *Predicted total pay*, where *Predicted total pay* is the exponentiated fitted regression value. It is important in our research design to control for the mechanical positive relationship between salary and executive pension awards, since pensions are granted or calculated as fractions of current

salary (Weight, 2013). Scaling compensation variables by salary also controls for higher absolute values of total pay, pension, bonus, and equity which are attributable to higher base salary.

$$Residual\ pay/Salary_{jit} = (Total\ pay - Predicted\ total\ pay)/Salary_{jit} + \varepsilon_{it}$$

We examine the relationship between residual pay and pensions (H_{1a}) as follows:

$$\begin{aligned} Pension/Salary_{jit} &= \beta_0 + \beta_1 Residual\ pay/Salary_{jit} + \sum \boldsymbol{\beta}(Firm\ Characteristics)_{it} \\ &+ AgeGroup_{jit} + Year_t + Industry_{it} + \varepsilon_{jit} \end{aligned} \quad (1A)$$

The *Pension/Salary* ratio is calculated as the executive's total pension compensation for the year, scaled by salary, *Residual pay/Salary* is as defined above, and *Firm Characteristics* is a vector of firm-specific variables. We then examine the relationship between pensions and performance-sensitive compensation (H_{1b}) as follows:

$$\begin{aligned} Pension/Salary_{jit} &= \beta_0 + \beta_1 Bonus/Salary_{jit} + \beta_2 Equity/Salary_{jit} \\ &+ \sum \boldsymbol{\beta}(Firm\ Characteristics)_{it} + AgeGroup_{jit} + Year_t \\ &+ Industry_{it} + \varepsilon_{jit} \end{aligned} \quad (1B)$$

The independent variables of interest are *Bonus/Salary* and *Equity/Salary*, which are calculated by dividing bonus and equity grants by salary, respectively.[10]

Consistent with prior literature (Sundaram and Yermack, 2007; Gerakos, 2010), we include a vector of firm-level control variables in Models 1A and 1B. We include two measures of performance, *ROA* (operating profit divided by the average of opening and closing total assets), and *Return* (market return for the year). These measures are widely used in prior research on executive pay (see Murphy, 1999, and Jenter and Frydman, 2010, for overviews of this literature). We include *Leverage*, measured as the ratio of long-term debt to total assets. Kalyta and Magnan (2008) argue that highly levered firms are less likely to honour future obligations, including those related to pensions, making pensions less attractive to CEOs. This implies that CEOs in highly levered firms are less

[10] We do not index compensation values for inflation, since collected pension values are net of inflation, and indexing may introduce additional variation into the data (Farrell et al., 2008).

likely to accept large pensions as a form of compensation, and may therefore have lower pensions. By contrast, Sundaram and Yermack (2007) argue that a positive association exists between leverage and pensions, because debt-based compensation reduces the agency costs of debt. We therefore make no directional prediction about the sign of this variable. Prior literature has also come to mixed conclusions about the role of leverage in other types of executive compensation (Lewellen et al., 1987; Ittner et al., 2003).

We include book-to-market ratio (*BTM*), the ratio of the book value to market value of equity, as an inverse measure of the firm's growth opportunities and organizational complexity (Baber et al., 1996; Smith and Watts, 1992), and firm risk (*Risk*), defined as the average monthly stock return beta over the past three years. As pension values are sensitive to age (Sundaram and Yermack, 2007), we include age group indicators, since pension awards are likely to be non-linear with age. Because the pattern of pension provision may vary by industry, we include industry controls in our model, using 2-digit Industrial Classification Benchmark (ICB) indicators.[11] In tabulated results, we present standard errors clustered by firm, though our results are not significantly different when clustering by firm and year.

(iv) The role of corporate governance

Our second analysis focuses on the role of corporate governance in the determination of executive pensions (H_2). We extend Model 1A to examine how corporate governance affects executive pensions, allowing for equilibrium compensation-setting. We estimate the following model:

$$\begin{aligned} Pension/Salary_{jit} &= \beta_0 + \beta_1 Residual\ pay/Salary_{jit} + \beta_2 \%NonExecOwn_{it} \\ &+ \beta_3 \%RemcoBusy_{it} + \beta_4 \%RemcoIndep_{it} + \beta_5 BoardSize_{it} \\ &+ \beta_6 \log(Tenure)_{jit} + \sum \boldsymbol{\beta}(Firm\ Characteristics)_{it} + AgeGroup_{jit} \\ &+ Year_t + Industry_{it} + \varepsilon_{jit} \end{aligned} \quad (2A)$$

[11] Because our sample is composed of FTSE 100 firms, there are some industries with relatively few observations. Estimating the model without industry fixed effects yields qualitatively similar results.

We include several monitoring and governance variables based on prior literature: non-executive director ownership, the busyness and independence of remuneration (compensation) committee members, board size, and CEO tenure.

Our measure of non-executive director ownership, *%NonExecOwn*, reflects the proportion of shares of the firm owned by its non-executive directors. We associate non-executive director ownership with greater monitoring (Cyert et al., 2002; Jensen and Meckling, 1976), and therefore we predict lower pension awards to executives as non-executive director ownership increases.

We expect monitoring to be weakened when directors are busy and have less time to devote to their monitoring duties. We refine the measure used by Fich and Shivdasani (2006) on busy directors to capture the proportion of busy remuneration committee members, *%RemcoBusy*. We classify members as busy if they have three or more board positions. We predict that this measure is positively associated with executive pensions, as busy committee members have less time and attention to devote to their duties, and are more likely to overlook or not to challenge pension arrangements (Core et al., 1999).

We expect the presence of non-independent or 'grey' directors on the remuneration committee to weaken monitoring, because such directors may have a prior relationship with the firm or with its executives (Bhagat and Black, 2002; Ryan and Wiggins, 2004). The presence of non-independent directors also increases the potential for cronyism (Brick et al., 2006), to the mutual benefit of both CEOs and the directors. The UK Combined Code (2000) defines independent directors as those 'free from any business or other relationship which could materially interfere with the exercise of their independent judgement', on the premise that they are likely to be stronger monitors (Combined Code, 2000:§A.3.2). We consider the independence of the remuneration committee (*%RemcoIndep*), as the remuneration committee are the first-line monitors of the compensation package at the board level. We predict that stronger monitoring associated with remuneration committee independence reduces the success of CEOs in obtaining more favourable pension arrangements.

We include board size (*BoardSize*) as a measure of board effectiveness. Prior research finds that larger size reduces the potential for an effective board (Yermack, 1996; Core et al., 1999). Yermack (1996) finds that smaller boards are more likely to force CEOs to accept riskier pay packages. Similarly, Ryan and Wiggins (2004) find that CEOs receive less equity pay in firms with more directors, and Core et al. (1999) find that CEO pay increases with board size. We therefore expect smaller boards to constrain pensions.

We draw on prior research considering CEO tenure as a measure of influence over the board, and include *Tenure*, defined as the number of years that the CEO has served on the board (Hill and Phan, 1991; Kalyta and Magnan, 2008; Ryan and Wiggins, 2004). Long-serving executives may become entrenched, have stronger influence over board members, and obtain more favourable compensation packages (Cremers and Palia, 2011).

Last, we construct a composite measure, *GovScore*, based on the individual governance criteria considered above. We identify firms as well-governed on each of the five measures above, measuring the number of dimensions on which the firm is better than the median.[12] For *%NonExecOwn* and *%RemcoIndep*, a firm is classified with 1 when it is above the median of sample firms. For *%RemcoBusy*, *BoardSize*, and *Tenure*, a firm is classified with 1 when it is below the median of sample firms. *GovScore* has a maximum score of 5. Our simplified specification with *GovScore* is as follows:

$$\begin{aligned} Pension/Salary_{jit} &= \beta_0 + \beta_1 Residual\ pay/Salary_{jit} + \beta_2 GovScore_{it} \\ &+ \sum \boldsymbol{\beta}(Firm\ Characteristics)_{it} + AgeGroup_{jit} + Year_t \\ &+ Industry_{it} + \varepsilon_{jit} \end{aligned} \tag{2B}$$

We extend this model further to consider the incremental effect of governance on the strength of substitution, including an interaction term, *Residual pay/Salary*GovScore*. Under the managerial power hypothesis, we expect that stronger board monitoring constrains the degree of substitution between pensions and residual pay, so that more of the compensation package is aligned with performance.

[12] In untabulated analysis, we use a threshold of the top third and find that our results are stronger.

(v) Dynamic analysis of pensions and performance-based compensation

Our analysis of H_3 focuses on the dynamic relationship between pensions and performance-based compensation from *t–1* to *t*. Based on the managerial power hypothesis, H_3 predicts a dynamic contemporaneous relationship between changes in pensions and declining bonuses or equity, if pensions are used to 'camouflage' pay. To separately identify decreases in bonuses, we construct the following change model:

$$\begin{aligned}\Delta Pension/Salary_{jit} &= \delta_0 + \delta_1 \Delta Bonus/Salary_{jit} + \delta_2 BonusSalaryDecreaseDV_{jit} \\ &+ \delta_3 \Delta Bonus/Salary * BonusSalaryDecreaseDV_{jit} \\ &+ \delta_4 \Delta Equity/Salary_{jit} + \delta_5 EquityDecreaseDV_{jit} \\ &+ \delta_6 \Delta Equity/Salary * EquityDecreaseDV_{jit} \\ &+ \sum \boldsymbol{\delta}(\Delta Firm\ Characteristics)_{it} + AgeGroup_{jit} + \varepsilon_{jit}\end{aligned} \quad (3)$$

where the dependent variable is the change in the *Pension/Salary* ratio for the j^{th} executive from *t–1* to *t*. Similarly, *ΔBonus/Salary* denotes the change in *Bonus/Salary* ratio and *BonusSalaryDecreaseDV* is an indicator variable coded 1 if there is a decrease in the bonus and salary of the j^{th} executive from *t–1* to *t*, and 0 otherwise. The interaction term *ΔBonus/Salary*BonusSalaryDecreaseDV* allows for incremental effects of both changes. Changes in equity-based compensation are similarly defined. *ΔFirm Characteristics* is the vector of firm-level variables as in Model 1A in their first differenced terms, except for *BTM*, which we leave undifferenced due to its correlation with *ΔReturn*.

The change specification allows us to test the dynamic association between changes in pensions and decreases in bonuses, controlling for other factors posited by prior literature to affect pensions. δ_1 corresponds to the change in bonus, δ_2 and δ_3 (the coefficient on interaction term) represent the additional intercept and slope difference for decreases in bonuses. The total coefficient for an executive with a decrease in the *Bonus/Salary* ratio is $\delta_1+\delta_3$ with an additional fixed increment of δ_2. We adopt the same methodology to examine decreases in equity compensation.

A positive δ_2 coefficient would reflect an additional fixed pension increment for executives with decreases in cash-based compensation during the year. A significantly negative δ_3 coefficient would show the degree to which executives with decreases in their bonuses are compensated with additional pension during the same period. A positive δ_2 and negative interaction term δ_3 would support H_3 that pensions are 'stealth' compensation which can be used to offset contemporaneous declines in performance-related compensation.

5. MAIN FINDINGS

(i) Pensions as a portfolio mix of total compensation

Table 4, Columns 1−2 reports results from estimating the relationship between pensions and residuals of *Total pay* (*Residual pay*), modelled on economic considerations (capturing 'excess' or 'deficient' visible pay), with industry controls. For brevity, we do not report results from our model estimating *Total pay*, but our results are generally consistent with those from earlier studies (Murphy, 1999). Results show that pensions are significantly negatively related to *Residual pay*, suggesting that executives with lower-than-expected observable pay receive a higher pension. The coefficient to *Residual pay/Salary* is negative as predicted and statistically significant at the 5% level and 1% level for CEOs and non-CEOs, respectively. This result supports H_{1a} and is consistent with an overall equilibrium compensation outcome.

Table 4, Columns 3−4 shows that pensions are significantly negatively related to bonuses. The coefficient on *Bonus/Salary* is negative as predicted, and statistically significant at the 1% level and 10% level for CEOs and non-CEOs, respectively. This evidence supports H_{1b}, suggesting that pensions function as a cross-sectional substitute for performance-based bonuses. Executives with larger bonuses receive lower pensions, and vice versa, though economically the rate of substitution is relatively low, at approximately 4−9%. We find no substitution effect on equity, and therefore focus on bonuses in subsequent tests.[13]

[13] Untabulated results from the pre-crisis period (2004–2008) show a marginally significant substitution effect on equity for non-CEOs.

Nonetheless, the negative relationship between pensions and residual pay may also imply that the complex and opaque nature of pensions provides executives with a 'stealth' mechanism to reduce the size of their total visible compensation. We are therefore cautious to interpret these results as implying causality in the residual pay-pension or bonus-pension tradeoff, where executives seek higher pensions in exchange for lower bonuses or other pay. Firms that grant higher pensions may be more conservative in granting bonuses or equity, or vice versa. Our findings contrast with those of Cadman and Vincent (2014), who find that pensions function as a low-risk complement to the rest of the compensation package, as total compensation (and individual elements) is higher for executives with pensions. In their setting, however, scale effects may imply that firms paying executives a higher salary, bonuses, and equity in dollar terms also pay higher pensions, resulting in higher total compensation.

Among our firm-level control variables, pensions are negatively related to risk, suggesting either that executives are less willing to accept pensions from riskier firms, or that riskier firms may offer a greater proportion of their compensation in the form of bonus and equity to increase alignment between pay and performance.

INSERT TABLE 4 HERE

(ii) The role of corporate governance

Table 5 presents results from our tests of H_2. Our results show that higher quality corporate governance reduces the magnitude of CEO pensions. Stronger board monitoring also has a constraining effect on the degree of substitution between pensions and residual pay, implying a reduced scope and potential for rent extraction via pensions. Column 1 shows that non-executive ownership *(%NonExecOwn*) has a negative and significant relationship with CEO pension, indicating that additional monitoring associated with ownership constrains the level of pension. While our negative finding on Remuneration committee independence (%*RemcoIndep*) points towards greater independent or unconflicted monitoring of pay constraining CEO pensions, it is not statistically significant when including industry fixed effects, as tabulated. Since the

average independence level in our sample firms is high, non-independence may be concentrated in certain industries and be subsumed by industry fixed effects.

BoardSize is positively related to the magnitude of CEO pension awards, consistent with weaker monitoring in a larger board (Core et al., 1999; Yermack, 1996). log(*Tenure*), as a measure of CEO power, is positively related to pensions, consistent with prior research, showing that entrenched or longer-tenured CEOs receive higher pensions (Cremers and Palia, 2011). However, the coefficient is only marginally significant; a median CEO *Tenure* of 4.9 years may not be sufficiently strong to build entrenched relationships. The coefficient to *%RemcoBusy* is negative but not significant. Our mixed finding on this variable is consistent with earlier mixed evidence on busy directors, providing no evidence that they shirk their responsibilities.

Table 5, Columns 2−3, reports results of tests based on our composite *GovScore* measure. The significantly negative coefficient to *GovScore* suggests that each added dimension of governance above the median is associated with a 12−14% lower *Pension/Salary* ratio. The interaction term between governance and residual pay (*Residual pay/Salary*GovScore*) is marginally significant and positive, suggesting that better governance not only constrains the magnitude of pensions, but also reduces the degree of substitution. The latter is consistent with prior literature on governance and the balance of pay packages (Ryan and Wiggins, 2004).[14]

Our findings on the mitigating role of strong corporate governance on pensions also build on earlier work on the relationship between CEO power and non-tax qualified supplemental pensions (Kalyta and Magnan, 2008) by considering the governance environment. They also complement the findings of Kabir and Minhat (2009) who find a positive relationship between CEO power and pension levels.

[14] In additional analysis, we include interactions of each individual corporate governance variable with *Residual pay* as an extension to Eq. (2A). We continue to find a significantly negative association between *Pension* and *Residual pay* in this extended model, and the magnitude of substitution is also qualitatively similar. The main results on the monitoring role of corporate governance on the magnitude of pensions also hold after controlling for individual interaction effects. In addition, we find that the degree of substitution between *Pension* and *Residual pay* is reduced in smaller and more independent boards.

INSERT TABLE 5 HERE

(iii) Dynamic pension-bonus substitution

Table 6 presents regression estimates from our dynamic model examining changes in the size of the pension and other elements of compensation. In this set of tests, we include only executives that have been in their current position for at least two years, and therefore our sample size is reduced. In Columns 1–2, we consider only movements in bonus, while in Columns 3–4, we include corresponding variables for changes in equity-based compensation.

Our results for both CEOs and non-CEOs show a general upward movement in pensions, both when bonuses are increasing and decreasing, shown by positive (though not significant) coefficients to both Δ*Bonus/Salary* and *BonusSalaryDecreaseDV*. However, the significantly negative coefficient to the interaction term (Δ*Bonus/Salary* **BonusSalaryDecreaseDV*) shows that pensions increase at a higher rate for executives experiencing a decrease in their bonus. On a time-series basis, pensions can therefore function as a substitute for declines in bonuses, which attract more public scrutiny. Our results are stronger for CEOs both statistically and economically compared to non-CEOs, consistent with CEOs being in a stronger bargaining position with respect to compensation than non-CEOs, and being able to extract larger rents than non-CEOs. The board may be more concerned about adverse consequences of reducing CEO compensation, such as demotivation, and more likely to err on the side of generosity, in the CEO's favour. However, we find no evidence for pensions as a dynamic substitute for equity, consistent with our cross-sectional results. Overall, our evidence suggests that pensions can be used as a dynamic substitute for bonus compensation. While reductions in visible, performance-based compensation improve the firm's potential distance to outrage (Bebchuk and Fried, 2004b), particularly in times of poor performance, they may be offset by increases in less visible pensions.

INSERT TABLE 6 HERE

(iv) CEO pensions and financial crisis

Since our sample period encompasses the 2008 financial crisis and the following period, we next consider how CEO pensions and the pension-substitution relationships have changed during our sample period. Greater investor, academic and regulatory scrutiny of pensions coincided with the financial crisis, which intensified the public debate on 'reward for failure.' However, prior research has not yet examined the impact of crisis on executive pensions, as sample periods have largely ended before the crisis (Gerakos, 2010; Cadman and Vincent, 2014; Kabir and Minhat, 2009). Consequently, in this section we examine whether there are changes in CEO pensions in relation to overall compensation, following the 2008 financial crisis.[15]

The predicted effect of a financial crisis on the relationship between pensions and other elements of compensation is unclear. Compensation contracts may change over time, and different patterns of executive compensation and incentives may emerge in response to financial and economic crisis. As a crisis is likely to bring about changes in the risk, product, and capital market environment of firms, it may induce changes in compensation structure and redesign of optimal executive pay contracts. For example, prior research suggests that intervention can lead to a change in compensation structure (Gilson and Vetsuypens, 1993; Brown and Lee, 2011).

First, changes to compensation structures arising from the 2008 financial crisis may have longer-term effects, as firms allow time to re-evaluate the success of new policies, and as new best practices spread through the market. Second, changes in accounting for pensions, increased uncertainty in equity markets, and increasing costs and liabilities of defined benefit pensions may lead firms to reduce defined benefit pension entitlements (Kiosse and Peasnell, 2009), and transfer risk back to individuals by shifting pensions towards defined contribution plans or salary supplements. Third, changes to UK tax policies, imposing lifetime and annual limits on the tax-deductibility of pensions, may have resulted in pensions becoming less attractive to firms and executives with significant

[15] Further robustness checks show that our main findings hold in the sub-period ending in 2008, prior to the financial crisis.

entitlements, as they result in not only additional taxes for over-limit executives but also additional tax costs for firms providing these benefits.

For these reasons, we hypothesize that pensions to executives decrease in the later part of our sample, and the substitution effect is weakened.[16] We investigate whether pensions and the tradeoff between pensions and excess compensation change during our sample period, estimating the following model:

$$\begin{aligned} Pension/Salary_{jit} &= \beta_0 + \beta_1 Residual\ pay/Salary_{jit} + \beta_2 PostCrisis_t \\ &+ \beta_3 PostCrisis * Residual\ pay/Salary_{jit} + \beta_4 GovScore \\ &+ \beta_5 GovScore * Residual\ pay/Salary_{jit} \\ &+ \sum \boldsymbol{\beta}(Firm\ Characteristics)_{it} + AgeGroup_{jit} + Industry_{it} + \varepsilon_{jit} \end{aligned} \quad (4)$$

We define *PostCrisis* as firm-years ending after 2008, with an indicator variable, *PostCrisis*, coded 1 for these firm-years and 0 otherwise.[17] The coefficient to *PostCrisis* reflects a fixed effect difference in pensions after 2008, while the interaction term (*Residual pay/Salary*PostCrisis*) allows us to examine how the substitution effect differs following the crisis. A positive coefficient to the interaction term would imply a weakening substitution effect following the crisis.

Results in Table 7 show how CEO pensions differ between pre- and post-crisis years. Our results show that CEO pensions are significantly lower following the financial crisis, in comparison to the pre-crisis period, with a reduction in the *Pension/Salary* ratio of 0.16 to 0.18 (a reduction of 21% from the average *Pension/Salary* ratio during the pre-crisis period). The coefficient on *Residual pay/Salary* is negative (–0.04) and highly significant, consistent with earlier specifications (Tables 4–5). However, the significant and positive coefficient to the interaction term, *Residual pay/Salary*PostCrisis*, suggests that the substitution effect is weakened after the financial crisis, consistent with structural changes in corporate pension policies following the crisis. Results in Columns 2–3

[16] An alternative prediction is that crisis-induced shocks to operating performance and stock prices may lead to reductions in performance-based compensation to executives (Gilson and Vetsuypens, 1993). The managerial power hypothesis predicts that firms use pensions as a substitute for declines in performance-based compensation, as pensions attract less public attention. However, our data do not show significant declines in performance-based compensation following the crisis.

[17] Adopting alternative cutoff dates for coding of the *PostCrisis* indicator yields similar results.

suggest that the decreases in pensions and substitution are incremental to the mitigating effects of corporate governance, which remain robust across both sub-periods of our sample.

A number of factors may help to explain our findings. First, financial distress, uncertainty, and the resulting additional scrutiny are likely to result in changes to bonus, equity, and in particular, pension policies, contributing to a weakened substitution effect.[18] Second, the decreased attractiveness of pensions to both firms and executives for institutional reasons may have led to a reduction in their use during the post-crisis period. Third, while financial crisis may bring about immediate changes to compensation policies, subsequent review, assessment, and recontracting during the recovery period may be a lengthy process, resulting in longer-term changes. Overall, the crisis and institutional changes in the UK setting are reflected in structural changes to the magnitude and role of pensions in executive compensation, as post-crisis pension awards are significantly lower than pre-crisis levels and substitution effects are weakened.

INSERT TABLE 7 HERE

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6. ADDITIONAL TESTS

(i) Foreign exchange listing and product market competition

Empirical evidence shows that product market relationships affect executive compensation (e.g. Cunat and Guadalupe, 2005; Subramanian, 2013). These may also have an influence on pensions, as firms with greater product market power may be able to offer more generous pension compensation to retain human capital. To control for this possibility, we include a proxy for product market power, *SalesShare*, calculated as the ratio of a firm's sales to aggregate industry sales in the same year.

Prior research finds that capital market relationships in the form of foreign exchange listing affect executive pay, though evidence is mixed (Gerakos et al., 2013; Fernandes et al., 2013). Gerakos et al. (2013) find that US exchange listing is associated

[18] We also perform a separate robustness analysis using a measure of financial distress based on a modified Altman (1968) Z-score, and find that distress has a similarly constraining effect on substitution.

with higher cash compensation for UK CEOs. In our context, cross-listed firms may be seen as competing for labour in a higher-paying peer group, or have additional resources. To test the relationship between US exchange listing and pensions, we include an indicator identifying firms cross-listed in the US (*SEC*). However, we have no *ex-ante* reason to predict that cross-listing is related to higher pensions in particular, compared to other types of pay.

Results in Table 8 show that the coefficient to *SalesShare* is positive and significantly related to the *Pension/Salary* ratio, suggesting that CEOs of firms with higher product market power have higher pension compensation. We find no evidence that foreign exchange listing (*SEC*) is related to CEO pensions. However, our inferences from Tables 4 and 5, examining performance-sensitive compensation, residual pay, and governance are unchanged in these specifications (Columns 1–3). We also re-estimate our model of pre-and post-financial crisis changes (Column 4), as product market competition may become more important during a period of economic recession. Our findings on changes after the financial crisis on the tradeoff between pension and excess compensation remain unchanged.

INSERT TABLE 8 HERE

(ii) Differential pension types

Our measure of pensions includes different types of pensions, which may entail different levels of risks for executives and firms alike. Therefore, the relative proportion of these components within the total pension may have implications for our findings and inferences. To check the robustness of our main findings to these issues, we partition our CEO sample between those who have a large majority of their pension award in a defined benefit pension plan, and those who do not. We classify CEOs as having a high proportion of defined benefit pensions if defined benefit pensions constitute more than 85% of their pension compensation.[19] We then re-estimate our baseline analyses on cross-sectional substitution between pension, bonus, and equity.

[19] Our results are similar if partitioning the sample between CEOs who receive defined-benefit pension

Our untabulated results show that the cross-sectional substitution between pensions and bonuses holds for both CEOs who derive the majority of their pension compensation from defined benefit pensions, and those CEOs who have a smaller or no defined benefit pension award. For high defined benefit CEOs, we find that the magnitude of substitution is higher. Nonetheless, we continue to observe a significant substitution effect for CEOs with small defined benefit pensions, and other types of pensions. Our results show that our main findings are not primarily driven by a certain pension type (i.e. defined benefit pensions). Further analysis including *SEC* and *SalesShare* in high- and low-defined benefit CEOs shows similar results.

(iii) The effect of taxes

We note in sections 2 and 5.4 that pensions are deductible for income tax purposes, but that HMRC limits the amount of retirement benefit that is tax deductible annually and over an individual's lifetime.[20] As a robustness check, we construct an indicator variable for executives whose total pension earnings exceed the HMRC's lifetime and annual allowances. We expect that already being over the HMRC limit has a negative effect on the magnitude of pension compensation (Models 1 and 2) and changes in pensions (Model 3). Our untabulated results show that individuals over the lifetime limit receive significantly lower pension awards and being over annual and lifetime limits reduces changes in pension. However, our main findings on the relationships between pensions, residual compensation and corporate governance remain qualitatively unchanged when including tax limits in our models.

(iv)The role of compensation consultants

Our evidence shows that pension arrangements for executives can be difficult to discern and understand. Their complex nature provides an opportunity for compensation consultants to help remuneration committee members understand regulations, market practices, contractual obligations, and other aspects of compensation. Like in the US, UK

awards only, and those who receive other types of pension compensation or mixed pension awards.

[20] These limits became effective from April 2006. This maximum, known as the lifetime allowance, was £1.6 million in 2006/07, the first year of its imposition, increasing to £1.8 million by 2010/11. The annual limit on tax-deductible pension savings was £215,000 in 2006/07 (£255,000 by 2010/11).

compensation consultants provide a number of other services (such as below-board level compensation consulting, actuarial valuation, pension consulting, serving as pension trustee, or auditing). In addition to independent compensation consultants, the UK market for compensation consulting is serviced by large international HR consulting firms and audit firms (Conyon et al., 2009; Goh and Gupta, 2010; Voulgaris et al., 2010). Therefore, the potential to cross-sell additional services or maintain cross-selling contracts may result in higher compensation. Consistent with this hypothesis, Murphy and Sandino (2010) find that executive compensation is higher in firms with consultants who cross-sell services, for a sample of US and Canadian firms. However, Conyon et al. (2009) and Cadman et al. (2010) find no evidence of higher or more favourable compensation with consultants who have cross-selling incentives.

We examine the relationship between pensions and compensation consultants for the sample period 2004–2008, a period for which we have compensation consultant data. In particular, we investigate more closely those with incentives to cross-sell services (both pension-related and otherwise). For firms with more than one consultant, we focus on the consultant who is either retained by the compensation committee or the primary consultant as identified in the disclosure. Our sample firms generally employ a specialist compensation consultant which focuses primarily on compensation consulting (33%), a large HR firm which offers other HR consulting and pension-related services (Towers Perrin, Watson Wyatt, Hewitt Associates, or Mercer; 35%), or one of the Big 4 accounting firms, who have a large share of the UK compensation consulting market, and who also offer auditing, and actuarial or other consulting services (26%). Last, we separately examine cases where the remuneration committee identifies a consultant who provides them with advice specifically on pension-related matters for executives (18%).

In contrast to agency predictions of compensation consultant conflicts of interest, we find no evidence that pensions (or total compensation including pensions) are significantly higher in firms that retain a large HR consultant, a Big 4 accounting firm, or a specific pension consultant, using either logged or scaled measures of pension. These results support those of Cadman et al. (2010) and Conyon et al. (2009) on conflicts of

interest, specifically in the pension context. Our findings are not surprising, however, in light of Conyon et al. (2009) and Voulgaris et al. (2010), who show that the impact of compensation consultants in UK firms occurs primarily through equity compensation.

7. CONCLUSION

This paper examines pensions as a form of executive compensation, their relationship with other elements of compensation, and their role in the overall executive compensation package. The relatively few earlier studies on pensions have not yet agreed on whether pensions function as a substitute or complement to the rest of the pay package, with inconclusive evidence. We contribute to emerging research and the debate on executive pensions, using a sample of CEOs and executives of large UK firms during the 2004–2011 period. We find that, after controlling for scale differences across observations, executive pensions are negatively and significantly related to the rest of the compensation package, particularly performance-sensitive compensation in the form of bonuses. This suggests a cross-sectional substitution between pensions and more visible and performance-sensitive elements of pay. We further show that CEO pensions are significantly higher and the above tradeoffs are stronger in firms with weaker governance, after controlling for equilibrium total pay. In such settings, CEOs therefore receive both higher pensions and more favourable compensation arrangements. We contribute new evidence on the dynamic association between declining bonuses and increasing pensions over time, showing that pensions can be a means of offsetting bonus decreases in less-visible ways, consistent with a managerial power view of compensation.

Our analyses and discussion of the UK setting contribute to understanding of the institutional environment and practices which influence the use of executive pensions, incremental to the US setting. When partitioning the sample into sub-periods, we find that the magnitude of pensions has declined and the substitution effect weakened in years following the financial crisis. In addition to greater scrutiny of pensions arising from the crisis, changes in the tax regime may have significantly affected executives, who have substantially higher pensions than rank-and-file employees and average earners. In our

descriptive evidence, we provide new insights on the prevalence and size of pensions in the UK executive labour market. We show that pension arrangements can be complex, comprising multiple elements, and discuss the complex nature of pension-related disclosures, which has hampered the ability of users to assemble an overall view of pensions. Combined with a lack of investor attention to pensions, complexity and opacity can lead to pensions being used as a mechanism for compensating for deficiencies in more visible elements of compensation. Greater public attention and shareholder monitoring may therefore reduce the strength of the 'camouflage' associated with pensions. Given that pension data has been largely uncollected by UK data providers, collection by researchers or secondary data providers in the future would improve the ability to draw inferences about incentives from various components of pay. Regulatory changes requiring standardized pension disclosures from 2014 will allow future research to give greater attention to pensions as a type of executive pay.

As executive pensions are relatively unexplored, there are a number of further avenues of research on the topic of pensions. We have highlighted several differences in characteristics of executive pension plans compared to those of rank-and-file employees. Further research comparing executive pension incentives to those of rank-and-file employees would provide additional insights into theories on executive compensation. Researchers may also examine pension awards in light of the health of corporate pension funds, and potential drivers of changes in pension benefits.

One limitation of our study is that our institutional setting is constrained to the UK, one of the few countries to require disclosure of pension benefits, and one of the leading countries in terms of compensation disclosure. Our research design has also not incorporated a direct control for pension-performance sensitivity. However, our paper provides the first step in this direction by considering performance-related tradeoffs within the compensation package. Exploring the pension-performance relationship and the effect of corporate governance on this relationship might be an avenue for future research. We also caution that our findings may not be generalizable beyond our sample

period, as our analyses show changing patterns to pensions in the latter part of our sample, and that the use of pensions is dynamic and responsive to regulatory change.

Our findings are relevant for compensation and governance researchers, and have important policy implications, suggesting the need to standardize and enhance the quality of disclosures for this important element of compensation. Overall, our findings highlight pensions as an important element of executive pay, and the need for greater attention from researchers and users to draw appropriate inferences.

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Appendix A: Examples of Executive Pension Disclosures and Transfer Out of Defined Benefit Pension Benefits in the UK

1. Extract from HSBC Holdings plc 2006 Remuneration Report (pp. 286–287)

This extract from HSBC Holdings's pension disclosure provides an example of the transfer out of defined benefit pension entitlements into a defined contribution plan.

> [On] 31 March 2006 M F Geoghegan ceased membership of, and the accrual of benefits under, the HSBC International Staff Retirement Benefits Scheme [….] M F Geoghegan transferred all his benefits out of the HSBC International Staff Retirement Benefits Scheme on 31 March 2006 with a transfer payment from the Scheme of £12,918,000 into the HSBC Asia Holdings Pension Plan on a defined contribution basis. There were no pension liabilities under the HSBC International Staff Retirement Benefits Scheme for M F Geoghegan at 31 December 2006.

2. Extract from Serco plc 2005 Remuneration Report (pp. 67–68)

This extract from Serco's executive pension disclosure provides an example of executives with different types of arrangements and with some components of untabulated pension awards (defined contribution pension and cash supplements are not included in the primary compensation or pension tables but are disclosed in footnotes to the pension table). Note (g) also demonstrates discretion on the part of the compensation committee to make additional pension payments.

> The Directors receive pension and life assurance benefits consistent with those provided by other leading companies. The details of the defined benefit schemes operated by the Group are set out in note 28. In the event of death in service, each scheme provides for a lump sum payment as well as a dependants' pension. The accrued pension benefits of all Directors under the Serco Pension and Life Assurance Scheme, which is a defined benefit scheme, are as follows:

	Transfer value of accrued benefits at 31 December 2005 (1)	Transfer value of accrued benefits at 31 December 2004 (2)	Director's contributions for the year (3)	Increase in transfer value during the year (4)=(1)-(2)-(3)	Gross increase in accrued pension during the year (5)	Increase in accrued pension during the year, net of inflation (6)	Value of net increase in accrual over the year (7)	Total accrued pension at year end (8)
	£	£	£	£	£ p.a.	£ p.a.	£	£ p.a.
K S Beeston	1,706,038	1,153,549	31,511	520,978	41,677	36,809	306,390	221,585
C R Hyman	259,286	183,260	15,705	60,321	4,390	3,724	17,549	29,040
A M Jenner	95,513	54,965	15,705	24,843	3,850	3,598	10,326	13,200

Selected notes to pension benefits:

> g) C R Hyman also benefits from a defined contribution arrangement to which the Company contributed prior to April 2005. The Company contributions to this arrangement were 15 per cent of remuneration in excess of the Permitted Maximum under the approved Scheme. These amounted to £10,815 in 2005.
>
> C R Hyman has received non-pensionable cash payments totalling £98,406 during 2005 in place of Company contributions to the defined contribution arrangement. In September 2004 he received a non-pensionable cash payment of

£95,400 in recognition of the higher contribution due from his time of appointment as Chief Executive.

h) A M Jenner also benefits from a defined contribution arrangement to which the Company contributed prior to June 2005. The Company contributions to this arrangement were 15 per cent of remuneration in excess of the Permitted Maximum under the approved Scheme. These amounted to £7,690 in 2005.

A M Jenner has received non-pensionable cash payments totalling £51,189 during 2005 in place of Company contributions to the defined contribution arrangement.

Table 1: Firm-level Descriptive Statistics

Variable	n	Mean	Q1	Median	Q3	S.D.
LogAssets	585	15.87	14.86	15.71	16.66	1.37
ROA	585	0.10	0.05	0.09	0.13	0.08
Return	585	0.16	0.00	0.16	0.35	0.35
Leverage	585	0.21	0.09	0.19	0.32	0.15
Risk	585	1.06	0.59	0.94	1.42	0.66
BTM	585	0.36	0.11	0.23	0.44	0.39
%NonExecOwn	585	0.05	0.00	0.00	0.01	0.03
%RemcoBusy	585	0.43	0.25	0.40	0.60	0.25
%RemcoIndep	585	0.94	1.00	1.00	1.00	0.15
BoardSize	585	10.75	9.00	11.00	12.00	2.41
GovScore	585	3.25	2.00	3.00	4.00	1.33

Notes to Table 1:
This table reports selected descriptive statistics for key regression variables. *LogAssets* is measured as the logarithmic transformation of the average of opening and closing total assets; *ROA* is operating profit scaled by the average of opening and closing total assets; *Return* is the total return to shareholders during the year, reflecting share price appreciation and dividend yield; *Leverage* is the ratio of debt to total assets; *Risk* is the beta of the firm's monthly returns over the past three years, and *BTM* is the ratio of the book value of equity to market value of equity. These variables are winsorized at the 1^{st} and 99^{th} percentiles. Our governance variables are defined as follows: *%NonExecOwn* is the fraction of the firm's shares that are owned by non-executive directors, *%RemcoBusy* is the proportion of members of the remuneration committee that hold 3 or more board positions, *%RemcoIndep* is the proportion of the remuneration committee that is composed of formally declared independent directors; *BoardSize* is the number of executive and non-executive directors on the firm's board of the directors, and *GovScore* is a composite index of the number of dimensions on which the sample firm is better than the median on individual firm governance characteristics, as well as CEO *Tenure*.

Table 2: Executive-level Descriptive Statistics

Variable	n	Mean	Q1	Median	Q3	S.D.
Salary	2,140	486	331	436	609	223
Bonus	2,140	450	143	300	589	494
Equity	2,140	1,492	379	866	1,768	1,998
Total pension	2,140	352	70	185	414	464
Age	2,140	51	47	51	55	6.2
Tenure	2,140	6.4	2.7	4.9	8.8	5.0

Notes to Table 2 (Monetary values in £thousands):
Table 2 reports descriptive statistics for all executive directors in the sample (both CEOs and non-CEOs). *Equity* is the value of short- and long-term incentive plans and stock option granted during the year. Stock option grants are measured at grant date using the Black-Scholes model, and incentive plans are valued at full value using closing market price at the end of the year of the grant (the fiscal year of the date of annual report). *Total pension* is the sum of all pension-related components (change in defined benefit pension entitlements, defined contribution pensions, and salary supplement). *Age* is age of executive directors in the sample. *Tenure* is measured as number of years on the board of directors. All variables except *Age* and *Tenure* are winsorized at the 1^{st} and 99^{th} percentiles. In our regression model, we use the logarithmic transformation of *Tenure:* log*(Tenure)*.

Table 3: Breakdown of Pension Arrangements among All Executives

Types of Pension Arrangement(s)	2004	2005	2006	2007	2008	2009	2010	2011	Total
Defined benefit only	193	166	114	92	80	80	80	14	**819**
	(53.3%)	(48.7%)	(38.1%)	(32.5%)	(29.5%)	(31.0%)	(30.2%)	(23.0%)	**(38.3%)**
Defined contribution only	59	57	48	65	60	72	60	13	**434**
	(16.3%)	(16.7%)	(16.1%)	(23.0%)	(22.1%)	(27.9%)	(22.6%)	(21.3%)	**(20.2%)**
Salary supplement only	7	14	19	29	35	29	47	16	**196**
in lieu of pension	(1.9%)	(4.1%)	(6.4%)	(10.3%)	(12.9%)	(11.2%)	(17.7%)	(26.2%)	**(9.16%)**
Defined benefit + defined	39	40	21	12	16	14	14	1	**157**
contribution	(10.8%)	(11.7%)	(7.0%)	(4.2%)	(5.9%)	(5.4%)	(5.3%)	(1.6%)	**(7.3%)**
Defined benefit + salary	26	24	47	53	51	34	26	9	**270**
supplement	(7.2%)	(7.0%)	(15.7%)	(18.7%)	(18.8%)	(13.2%)	(9.8%)	(14.8%)	**(12.6%)**
Defined benefit + defined	8	10	14	3	1	2	3	0	**41**
contribution+ salary supplement	(2.2%)	(2.9%)	(4.7%)	(1.1%)	(0.4%)	(0.78%)	(1.13%)	(0.0%)	**(1.9%)**
Defined contribution + salary	15	18	25	15	10	8	10	4	**105**
supplement	(4.1%)	(5.3%)	(8.4%)	(5.3%)	(3.7%)	(3.1%)	(3.8%)	(6.6%)	**(4.9%)**
No pension provision	15	12	11	14	18	19	25	4	**118**
	(4.1%)	(3.5%)	(3.7%)	(5.0%)	(6.6%)	(7.4%)	(9.4%)	(6.6%)	**(5.5%)**
Total number of executives	**362**	**341**	**299**	**283**	**271**	**258**	**265**	**61**	**2,140**

Notes to Table 3:
Table 3 identifies the type of pension plan(s) provided for all executives (both CEOs and non–CEOs) in the sample during the 2004–2011 period, with all permutations and combinations of defined benefit and defined contribution pensions, and salary supplements in lieu of pension awards. Percentages of the annual total are shown in parentheses.

Table 4: Pension Compensation Levels and Other Elements of Total Compensation

	(1) CEOs Only	(2) Non–CEO Executives	(3) CEOs Only	(4) Non–CEO Executives
Variables	***Pension/ Salary***	***Pension/ Salary***	***Pension/ Salary***	***Pension/ Salary***
Residual pay/Salary	–0.02**	–0.02***		
	(–2.04)	(–2.92)		
Bonus/Salary			–0.09***	–0.04*
			(–3.18)	(–1.76)
Equity/Salary			–0.00	–0.01
			(–0.05)	(–1.12)
ROA	–0.15	0.36	–0.10	0.51
	(–0.21)	(0.69)	(–0.13)	(0.92)
Return	–0.17	–0.09	–0.17	–0.11
	(–1.24)	(–0.89)	(–1.22)	(–1.03)
Leverage	0.52	0.14	0.39	0.10
	(1.07)	(0.45)	(0.79)	(0.33)
Risk	–0.17**	–0.13***	–0.14**	–0.12**
	(–2.56)	(–2.76)	(–2.20)	(–2.43)
BTM	–0.09	0.13	–0.15	0.11
	(–0.65)	(1.13)	(–1.10)	(0.98)
Constant	0.85*	0.37	0.89*	0.36
	(1.96)	(1.59)	(1.98)	(1.50)
AgeGroup dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Observations	585	1,555	585	1,555
Adj. R–squared	0.15	0.20	0.15	0.19

Notes to Table 4:
This table reports coefficient estimates and t–statistics (in parentheses) for OLS regression models estimating the relationship between *Pension* and *Residual pay* (Columns 1–2) and *Pension*, *Bonus*, and *Equity* (Columns 3–4) for both CEOs and non-CEO executives. We estimate the following models:

$$Pension/Salary_{jit} = \beta_0 + \beta_1 Residual\ pay/Salary_{jit} + \sum \boldsymbol{\beta}(Firm\ Characteristics)_{it} + AgeGroup_{jit} + Year_t + Industry_{it} + \varepsilon_{jit} \quad (1A)$$

$$Pension/Salary_{jit} = \beta_0 + \beta_1 Bonus/Salary_{jit} + \beta_2 Equity/Salary_{jit} + \sum \boldsymbol{\beta}(Firm\ Characteristics)_{it} + AgeGroup_{jit} + Year_t + Industry_{it} + \varepsilon_{jit} \quad (1B)$$

Residual pay is the unexplained compensation from an OLS regression estimating total visible compensation based on economic determinants. All other variables are as defined in Table 1. White t–statistics are based on heteroskedastic-consistent standard errors after clustering by firm; results are similar when clustering by both firm and year. *** $p < 0.01$, ** $p < 0.05$, * < 0.10

Table 5: CEO Pensions and Corporate Governance Characteristics

	(1) CEOs Only	(2) CEOs Only	(3) CEOs Only
Variables	***Pension/ Salary***	***Pension/ Salary***	***Pension/ Salary***
Residual pay/Salary	–0.02**	–0.02**	–0.07**
	(–2.52)	(–2.04)	(–2.19)
%NonExecOwn	–0.14***		
	(–3.31)		
%RemcoBusy	0.18		
	(1.10)		
%RemcoIndep	–0.51		
	(–1.56)		
BoardSize	0.07***		
	(3.59)		
log(*Tenure*)	0.13*		
	(1.69)		
GovScore		–0.12***	–0.14***
		(–3.95)	(–4.21)
*Residual pay/Salary*GovScore*			0.01*
			(1.92)
Constant	0.01	1.09***	1.11***
	(0.02)	(2.81)	(2.89)
Firm Characteristics	Yes	Yes	Yes
AgeGroup dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Observations	585	585	585
Adj. R–squared	0.22	0.19	0.20

Notes to Table 5:
This table reports coefficient estimates and t–statistics (in parentheses) for OLS regression models estimating the relationship between *Pension*, *Residual pay*, and individual corporate governance measures (Column 1), a composite *GovScore* (Column 2), and *GovScore* with an interaction term, *Residual pay/Salary*GovScore* (Column 3), for CEOs. We estimate the following baseline models:

$$Pension/Salary_{jit} = \beta_0 + \beta_1 Residual\ pay/Salary_{jit} + \beta_2 \%NonExecOwn_{it} + \beta_3 \%RemcoBusy_{it} + \beta_4 \%RemcoIndep_{it} + \beta_5 BoardSize_{it} + \beta_6 \log(Tenure)_{jit} + + \sum \boldsymbol{\beta} (Firm\ Characteristics)_{it} + AgeGroup_{jit} + Year_t + Industry_{it} + \varepsilon_{jit} \quad (2A)$$

$$Pension/Salary_{jit} = \beta_0 + \beta_1 Residual\ pay/Salary_{jit} + \beta_2 GovScore_{it} + \sum \boldsymbol{\beta} (Firm\ Characteristics)_{it} + AgeGroup_{jit} + Year_t + Industry_{it} + \varepsilon_{jit} \quad (2B)$$

All variables are as defined in Table 1. White t–statistics are based on heteroskedastic-consistent standard errors after clustering by firm; results are similar when clustering by both firm and year. *** p < 0.01, ** p < 0.05, * < 0.10

Table 6: Changes in Executive Pensions and Other Elements of Compensation

	(1) CEOs Only	(2) Non–CEO Executives	(3) CEOs Only	(4) Non–CEO Executives
Variables	**Δ*Pension/ Salary***	**Δ*Pension/ Salary***	**Δ*Pension/ Salary***	**Δ*Pension/ Salary***
Δ*Bonus/Salary*	0.10	0.06	0.12	0.07
	(1.33)	(0.78)	(1.55)	(0.83)
BonusSalaryDecreaseDV	0.18	0.13	0.21	0.14
	(1.33)	(1.36)	(1.48)	(1.43)
Δ*Bonus/Salary*BonusSalaryDecreaseDV*	–0.20**	–0.09*	–0.20**	–0.09*
	(–2.35)	(–1.87)	(–2.42)	(–1.69)
Δ*Equity/Salary*			–0.02	–0.01
			(–0.70)	(–0.31)
EquityDecreaseDV			0.00	0.00
			(0.00)	(0.05)
Δ*Equity/Salary*EquityDecreaseDV*			0.01	–0.00
			(0.20)	(–0.11)
Δ*ROA*	0.95	1.38	0.88	1.39
	(0.61)	(1.26)	(0.55)	(1.22)
Δ*Return*	0.05	0.18***	0.06	0.19***
	(0.46)	(2.78)	(0.53)	(2.79)
Δ*Leverage*	0.40	–0.11	0.38	–0.13
	(1.01)	(–0.18)	(0.98)	(–0.22)
Δ*Risk*	0.03	0.04	0.03	0.03
	(0.24)	(0.37)	(0.18)	(0.30)
BTM	0.39**	0.21*	0.37*	0.20
	(2.14)	(1.69)	(1.72)	(1.58)
Constant	0.68***	0.02	0.65**	0.03
	(2.80)	(0.12)	(2.56)	(0.26)
AgeGroup dummies	Yes	Yes	Yes	Yes
Observations	417	976	417	976
Adj. R–squared	0.03	0.02	0.03	0.02

Notes to Table 6:
This table reports coefficient estimates and t–statistics (in parentheses) for fixed effects regression models estimating the relationships between Δ*Pension/Salary* and Δ*Bonus/Salary* with interaction term, Δ*Bonus/Salary*BonusSalaryDecreaseDV*, in Columns 1−2, adding Δ*Equity/Salary* with interaction term, Δ*Equity/Salary*EquityDecreaseDV*, in Columns 3−4. These capture the dynamic association between decreases in performance-related pay components and changes in pensions. We estimate the following model:

$$\begin{aligned}\Delta Pension/Salary_{jit} &= \delta_0 + \delta_1 \Delta Bonus/Salary_{jit} + \delta_2 BonusSalaryDecreaseDV_{jit} \\ &+ \delta_3 \Delta Bonus/Salary * BonusSalaryDecreaseDV_{jit} + \delta_4 \Delta Equity/Salary_{jit} \\ &+ \delta_5 EquityDecreaseDV_{jit} + \delta_6 \Delta Equity/Salary * EquityDecreaseDV_{jit} \\ &+ \sum \boldsymbol{\delta} (\Delta Firm\ Characteristics)_{it} + AgeGroup_{jit} + \varepsilon_{jit}\end{aligned} \quad (3)$$

BonusSalaryDecreaseDV and *EquityDecreaseDV* are indicator variables coded to 1 when there is a decrease in the *Bonus* and *Salary*, and *Equity*, respectively, and zero otherwise. Δ is the change operator, with all other variables as defined in Table 1. White t–statistics are based on heteroskedastic-consistent standard errors after clustering by firm. *** p < 0.01, ** p < 0.05, * < 0.10

Table 7: CEO Pensions and Financial Crisis

Variables	(1) CEOs Only *Pension/ Salary*	(2) CEOs Only *Pension/ Salary*	(3) CEOs Only *Pension/ Salary*
Residual pay/Salary	–0.04***	–0.03***	–0.07***
	(–3.92)	(–3.73)	(–2.71)
PostCrisis	–0.17**	–0.18**	–0.16**
	(–2.44)	(–2.61)	(–2.44)
*PostCrisis*Residual pay/Salary*	0.03**	0.03**	0.03*
	(2.44)	(2.05)	(1.86)
GovScore		–0.12***	–0.13***
		(–3.66)	(–3.85)
*GovScore*Residual pay/Salary*			0.01*
			(1.73)
ROA	–0.30	–0.31	–0.28
	(–0.40)	(–0.44)	(–0.40)
Return	–0.01	0.01	0.01
	(–0.09)	(0.07)	(0.10)
Leverage	0.45	0.40	0.39
	(0.99)	(0.93)	(0.91)
Risk	–0.18***	–0.14**	–0.14**
	(–2.65)	(–2.10)	(–2.14)
BTM	–0.10	–0.11	–0.10
	(–0.71)	(–0.87)	(–0.78)
Constant	0.78*	1.08***	1.09***
	(1.88)	(2.65)	(2.71)
AgeGroup dummies	Yes	Yes	Yes
Year dummies	No	No	No
Industry dummies	Yes	Yes	Yes
Observations	585	585	585
Adj. R–squared	0.17	0.21	0.21

Notes to Table 7:
This table reports coefficient estimates and t–statistics (in parentheses) for OLS regression models estimating the relationships between *Pension*, *Residual pay*, the *PostCrisis* period, and *GovScore*, for CEOs. We estimate the following model:

$$\begin{aligned} Pension/Salary_{jit} &= \beta_0 + \beta_1 Residual\ pay/Salary_{jit} + \beta_2 PostCrisis_t \\ &+ \beta_3 PostCrisis * Residual\ pay/Salary_{jit} + \beta_4 GovScore \\ &+ \beta_5 GovScore * Residual\ pay/Salary_{jit} \\ &+ \sum \boldsymbol{\beta} (Firm\ Characteristics)_{it} + AgeGroup_{jit} + Industry_{it} + \varepsilon_{jit} \end{aligned} \quad (4)$$

PostCrisis dummy variable, coded 1 for years 2009–2011, and 0 for years 2004–2008. All other variables are as defined in Table 1. White t–statistics are based on heteroskedastic-consistent standard errors after clustering by firm; results are similar when clustering by both firm and year. *** p < 0.01, ** p < 0.05, * < 0.10

Table 8: Foreign Exchange Listing, Product Market Competition, and CEO Pensions

	(1) CEOs Only	(2) CEOs Only	(3) CEOs Only	(4) CEOs Only
Variables	***Pension/ Salary***	***Pension/ Salary***	***Pension/ Salary***	***Pension/ Salary***
Bonus/Salary	–0.10***			
	(–3.37)			
Equity/Salary	–0.01			
	(–0.63)			
Residual pay/Salary		–0.02**	–0.02**	–0.04***
		(–2.39)	(–2.48)	(–3.90)
GovScore			–0.11***	–0.10***
			(–3.21)	(–2.95)
PostCrisis				–0.20***
				(–2.82)
*Residual pay/Salary*PostCrisis*				0.03**
				(2.43)
SalesShare	2.49***	2.20***	1.53**	1.51**
	(3.16)	(2.85)	(2.03)	(2.10)
SEC	0.15	0.14	0.13	0.17
	(1.20)	(1.12)	(1.07)	(1.42)
ROA	–0.31	–0.38	–0.33	–0.46
	(–0.43)	(–0.54)	(–0.49)	(–0.68)
Return	–0.11	–0.13	–0.13	0.02
	(–0.98)	(–1.09)	(–1.13)	(0.16)
Leverage	0.45	0.64	0.55	0.43
	(1.04)	(1.49)	(1.33)	(1.07)
Risk	–0.10*	–0.14**	–0.11*	–0.12*
	(–1.75)	(–2.25)	(–1.72)	(–1.84)
BTM	–0.23*	–0.15	–0.16	–0.14
	(–1.80)	(–1.10)	(–1.16)	(–1.06)
Constant	0.87**	0.80**	1.07***	0.99***
	(2.25)	(2.13)	(2.81)	(2.62)
AgeGroup dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	No
Industry dummies	Yes	Yes	Yes	Yes
Observations	585	585	585	585
Adj. R–squared	0.21	0.20	0.22	0.22

Notes to Table 8:
This table reports coefficient estimates and t–statistics (in parentheses) for OLS regression models estimating the relationship between *Pension*, *Bonus*, and *Equity* (Column 1), and *Pension* and *Residual pay* (Column 2), including the variables *SalesShare* and *SEC* in the model as robustness checks. We estimate versions of the following models:

$$Pension/Salary_{jit} = \beta_0 + \beta_1 Bonus/Salary_{jit} + \beta_2 Equity/Salary_{jit} + \beta_3 SalesShare_{it} + \beta_4 SEC_{it} + \sum \boldsymbol{\beta}(Firm\ Characteristics)_{it} + AgeGroup_{jit} + Year_t + Industry_{it} + \varepsilon_{jit}$$

$$Pension/Salary_{jit} = \beta_0 + \beta_1 Residual\ pay/Salary_{jit} + \beta_2 Govscore_{it} + \beta_3 PostCrisis_{it} + \beta_4 Residual\ pay/Salary * PostCrisis_{jit} + \beta_5 SalesShare_{it} + \beta_6 SEC_{it} + \sum \boldsymbol{\beta} (Firm\ Characteristics)_{it} + AgeGroup_{jit} + Industry_{it} + \varepsilon_{jit}$$

SalesShare is defined as the ratio of a firm's sales to aggregate industry sales in the same year and *SEC* is an indicator variable coded as 1 if the firm is cross-listed in the United States and 0 otherwise. *PostCrisis* is a dummy variable, coded 1 for years 2009–2011, and 0 for years 2004–2008. Column 3 includes *GovScore* and Column 4 includes *PostCrisis* and an interaction term *Residual pay/Salary*PostCrisis*. All other variables are as defined in Table 1. White t–statistics are based on heteroskedastic-consistent standard errors after clustering by firm; results are similar when clustering by both firm and year. *** p < 0.01, ** p < 0.05, * < 0.10